

We claim:

Sub. a' 1. A valve assembly comprising:

a valve housing comprising a housing top portion, a tubular retaining wall, and a valve seat, said tubular retaining wall depending from and being integrally formed with said housing top portion and having an inner surface with a shoulder integrally formed therein, said valve seat depending from and being integrally formed with said housing top portion and having a first seating surface;

a valve receivable within said valve housing, said valve comprising a flange having a top flange surface and a bottom flange surface; and

a valve retainer having a retainer retention portion and a valve engaging surface, said valve retainer being shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall, wherein at least one of (i) the first seating surface is non-complementary to the top flange surface and (ii) the bottom flange surface is non-complementary to the valve engaging surface.

2. A valve assembly according to claim 1 wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iii) the first angle is greater than the top flange angle.

3. A valve assembly according to claim 2, wherein the first angle is about 1 degree to about 25 degrees greater than the top flange angle.

4. A valve assembly according to claim 2, wherein the first angle is about 14 degrees greater than the top flange angle.

5. A valve assembly comprising:  
a valve housing comprising a housing top portion, a tubular retaining wall, and a valve seat, said tubular retaining wall depending from and being integrally formed with said housing top portion and having an inner surface with a shoulder integrally formed therein, said valve seat depending from and being integrally formed with said housing top portion and having a first seating surface, said valve seat comprising a projection having a second seating surface;

a valve receivable within said valve housing, said valve comprising a flange having a top flange surface and a bottom flange surface; and

a valve retainer having a retainer retention portion and a valve engaging surface, said valve retainer being shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall, wherein at least one of (i) the first seating surface is non-complementary to the top flange surface, (ii) the second seating surface is non-complementary to the top flange surface, and (iii) the bottom flange surface is non-complementary to the valve engaging surface.

6. A valve assembly according to claim 5, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the first angle is greater than the top flange angle.

7. A valve assembly according to claim 6, wherein the first angle is about 1 degree to about 25 degrees greater than the top flange angle.

8. A valve assembly according to claim 6, wherein the first angle is about 14 degrees greater than the top flange angle.

9. A valve assembly according to claim 6, wherein the second angle is about 5 degrees to about 10 degrees.

10. A valve assembly according to claim 6, wherein the second angle is about 6 degrees.

11. A valve assembly according to claim 5, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the second angle is greater than zero.

12. A valve assembly according to claim 11, wherein the second angle is about 5 degrees to about 10 degrees.

13. A valve assembly according to claim 11, wherein the second angle is about 6 degrees.

14. A valve assembly according to claim 5, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the first angle and the second angle are different.

15. A valve assembly according to claim 14, wherein at least one of the first angle and the second angle is different than the top flange angle.

16. A valve assembly according to claim 14, wherein the second angle is smaller than the first angle.

17. A valve assembly according to claim 14, wherein the first angle is about 22 degrees to about 45 degrees.

18. A valve assembly according to claim 14, wherein the first angle is about 30 degrees to about 40 degrees.

19. A valve assembly according to claim 14, wherein the first angle is about 36 degrees.

20. A valve assembly according to claim 14, wherein the first angle is about 22 degrees to about 45 degrees and the second angle is about 5 degrees to about 10 degrees.

21. A lid comprising:

a cover receiving portion having a first aperture and a second aperture formed therein, and having a top side and a bottom side;

a valve housing comprising a tubular retaining wall and a valve seat, said tubular retaining wall depending from and being integrally formed with the bottom side of said cover receiving portion and having an inner surface with a shoulder integrally formed therein, said valve seat depending from and being integrally formed with the bottom side of said cover receiving portion;

a valve receivable within said valve housing;

a valve retainer having a retainer retention portion, said valve retainer shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall;

a hinge integrally formed with said cover receiving portion and positioned so that the first aperture is on one side of said hinge and the second aperture is on an opposite side of said hinge; and

a cover attached to said cover receiving portion via said hinge, said cover comprising a first sidewall and a second sidewall opposite said first sidewall, each of said first sidewall and said second sidewall having a protrusion extending therefrom and shaped so as to engage one of the first aperture and the second aperture, wherein said cover is pivotally attached to said lid via said hinge, and said cover pivots relative to said cover receiving portion so that when the protrusion on said first sidewall of said cover is pivoted toward the first aperture, the protrusion on said second sidewall of said cover simultaneously pivots away from the second aperture.

22. A lid according to claim 21, said valve seat comprising a first seating surface, said first seating surface being inclined at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall.

23. A lid according to claim 22, said valve seat further comprising a projection, said projection comprising a second seating surface, said second seating surface being at a second angle relative to the plane orthogonal to the central longitudinal axis of said tubular retaining wall.

24. A lid according to claim 23, wherein the first angle and the second angle are different.

25. A lid according to claim 24, wherein the second angle is smaller than the first angle.

26. A lid according to claim 22, wherein the first angle is about 22 degrees to about 45 degrees.

27. A lid according to claim 22, wherein the first angle is about 30 degrees to about 40 degrees.

28. A lid according to claim 22, wherein the first angle is about 36 degrees.

29. A lid according to claim 23, wherein the first angle is about 22 degrees to about 45 degrees and the second angle is about 5 degrees to about 10 degrees.

30. An assembly from which to drink, said assembly comprising:  
a container having an upper lip; and  
a lid removably attachable to the upper lip of said container, said lid comprising (i) a substantially flat portion having a first aperture and a second aperture formed therein, and having a top side and a bottom side; (ii) a hinge integrally formed with said substantially flat portion and positioned so that the first aperture is on one side of said hinge and the second aperture is on an opposite side of said hinge; (iii) a valve housing comprising a tubular retaining wall and a valve seat, said tubular retaining wall depending from and being integrally formed with the bottom side of said substantially flat portion and having an inner surface with a shoulder integrally formed therein, said valve seat depending from and being integrally formed with the bottom side of said substantially flat portion; (iv) a valve receivable within said valve housing; (v) a valve retainer having a retainer retention portion, said valve retainer shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall; (vi) a cover attached to said substantially flat portion via said hinge, said cover comprising a first sidewall and a second sidewall opposite said first sidewall, each of said first sidewall and said second sidewall having a protrusion extending therefrom and shaped so as to engage one of the first aperture and the second aperture; and (vii) a peripheral wall shaped so as to receive the upper lip therewithin.

31. An assembly according to claim 30, said valve seat comprising a first seating surface, said first seating surface being inclined at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall.

32. An assembly according to claim 31, said valve seat further comprising a projection, said projection comprising a second seating surface, said second seating surface being at a second angle relative to the plane orthogonal to the central longitudinal axis of said tubular retaining wall.

33. An assembly according to claim 32, wherein the first angle and the second angle are different.

34. An assembly according to claim 33, wherein the second angle is smaller than the first angle.

35. An assembly according to claim 31, wherein the first angle is about 22 degrees to about 45 degrees.

36. An assembly according to claim 31, wherein the first angle is about 30 degrees to about 40 degrees.

37. An assembly according to claim 31, wherein the first angle is about 36 degrees.

38. An assembly according to claim 32, wherein the first angle is about 22 degrees to about 45 degrees and the second angle is about 5 degrees to about 10 degrees.

39. An improved assembly from which to drink including a container and a lid, the lid having (i) a first aperture and a second aperture formed therein and a top side and a bottom side, (ii) a hinge positioned so that the first aperture is on one side of the hinge and the second aperture is on an opposite side of the hinge, and (iii) an aperture cover pivoting via the hinge, the improvement comprising:

a valve housing comprising a tubular retaining wall and a valve seat, said tubular retaining wall depending from and being integrally formed with the bottom side of the lid and having an inner surface with a shoulder integrally formed therein, said valve seat depending

from and being integrally formed with the bottom side of the lid and having a first seating surface;

a valve receivable within said valve housing, said valve comprising a flange having a top flange surface and a bottom flange surface; and

a valve retainer having a retainer retention portion and a valve engaging surface, said valve retainer shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall, wherein at least one of (i) the first seating surface is non-complementary to the top flange surface and (ii) the bottom flange surface is non-complementary to the valve engaging surface.

40. An improved assembly according to claim 39 wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iii) the first angle is greater than the top flange angle.

41. An improved assembly according to claim 40, wherein the first angle is about 1 degree to about 25 degrees greater than the top flange angle.

42. An improved assembly according to claim 40, wherein the first angle is about 14 degrees greater than the top flange angle.

43. An improved assembly from which to drink including a container and a lid, the lid having (i) a first aperture and a second aperture formed therein and a top side and a bottom side, (ii) a hinge positioned so that the first aperture is on one side of the hinge and the second aperture is on an opposite side of the hinge, and (iii) an aperture cover pivoting via the hinge, the improvement comprising:

a valve housing comprising a tubular retaining wall and a valve seat, said tubular retaining wall depending from and being integrally formed with the bottom side of the lid and

having an inner surface with a shoulder integrally formed therein, said valve seat depending from and being integrally formed with the bottom side of the lid and having a first seating surface, said valve seat comprising a projection having a second seating surface;

a valve receivable within said valve housing, said valve comprising a flange having a top flange surface and a bottom flange surface; and

a valve retainer having a retainer retention portion and a valve engaging surface, said valve retainer shaped so as to retain said valve within said tubular retaining wall and against said valve seat via engagement of the retainer retention portion with the shoulder of said tubular retaining wall, wherein at least one of (i) the first seating surface is non-complementary to the top flange surface, (ii) the second seating surface is non-complementary to the top flange surface, and (iii) the bottom flange surface is non-complementary to the valve engaging surface.

44. An improved assembly according to claim 43, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the first angle is greater than the top flange angle.

45. An improved assembly according to claim 44, wherein the first angle is about 1 degree to about 25 degrees greater than the top flange angle.

46. An improved assembly according to claim 44, wherein the first angle is about 14 degrees greater than the top flange angle.

47. An improved assembly according to claim 44, wherein the second angle is about 5 degrees to about 10 degrees.

48. An improved assembly according to claim 44, wherein the second angle is about 6 degrees.

49. An improved assembly according to claim 43, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the second angle is greater than zero.

50. An improved assembly according to claim 49, wherein the second angle is about 5 degrees to about 10 degrees.

51. An improved assembly according to claim 49, wherein the second angle is about 6 degrees.

52. An improved assembly according to claim 43, wherein (i) the first seating surface is at a first angle relative to a plane orthogonal to a central longitudinal axis of said tubular retaining wall, (ii) the second seating surface is at a second angle relative to a plane orthogonal to the central longitudinal axis of said tubular retaining wall, (iii) the top flange surface is at a top flange angle relative to a plane orthogonal to a central longitudinal axis of said valve, and (iv) the first angle and the second angle are different.

53. An improved assembly according to claim 52, wherein at least one of the first angle and the second angle is different than the top flange angle.

54. An improved assembly according to claim 52, wherein the second angle is smaller than the first angle.

55. An improved assembly according to claim 52, wherein the first angle is about 22 degrees to about 45 degrees.

56. An improved assembly according to claim 52, wherein the first angle is about 30 degrees to about 40 degrees.

57. An improved assembly according to claim 52, wherein the first angle is about 36 degrees.

58. An improved assembly according to claim 52, wherein the first angle is about 22 degrees to about 45 degrees and the second angle is about 5 degrees to about 10 degrees.